

WHAT IS CLAIMED IS:

1. A vapor phase growth apparatus allowing vapor phase growth of a silicon single crystal film on a main surface of a silicon single crystal substrate to proceed therein,
5 having a reaction vessel having a gas introducing port formed on a first end side in the horizontal direction, and having a gas discharging port on a second end side in the same direction, configured as allowing a source gas for forming the silicon single crystal film to be introduced through the gas introducing port into
10 the reaction vessel, and to flow along the main surface of the silicon single crystal substrate held in a near-horizontally rotating manner in the inner space of the reaction vessel, and to be discharged through the gas discharging port, the silicon single crystal substrate
15 being disposed on a disc-formed susceptor rotated in the inner space, and having a bank component disposed so as to surround the susceptor, and kept in a positional relation so as to align the top surface thereof at an almost same level with the top surface of the susceptor, and
20 further configured so that the gas introducing port is opened so as to oppose to the outer peripheral surface of the bank component, so as to allow the source gas supplied through the gas introducing port to collide against the outer peripheral surface of the bank component and to climb up onto the top surface side thereof,

and then to flow along the main surface of the silicon single crystal substrate on the susceptor,

further comprising an upper lining component disposed so as to hang over the bank component, while forming a gas

5 introducing gap communicated with the reaction vessel by the bank component and the upper lining component;

wherein, assuming a virtual center line along the direction of flow of the source gas, extending from the first end of the reaction vessel towards the second end, while crossing normal to the axis of
10 rotation of the susceptor, as the horizontal standard line, and also assuming the direction normal to both of the axis of rotation of the susceptor and the horizontal standard line as the width-wise direction,

the gas introducing gap is configured so that the
15 length-to-be-formed thereof in the parallel direction with the horizontal standard line is shortened in a continuous or step-wise manner as distanced from the horizontal standard line in the width-wise direction, or remained constant at any position.

20 2. The vapor phase growth apparatus as claimed in Claim 1, configured so that the degree of overlapping, in the vertical direction, of the top surface of the bank component forming the gas introducing gap and the lower surface of the lining component forming the same is reduced as distanced from the horizontal

standard line in the width-wise direction, or remained constant at any position.

3. The vapor phase growth apparatus as claimed in Claim
5 1 or 2, configured so that the inner periphery of the lower surface of the upper lining component is located on the upstream side, in the direction of flow of the source gas, rather than on the inner periphery of the top surface of the bank component.

10 4. The vapor phase growth apparatus as claimed in any one of Claims 1 to 3, configured so that, on the exit side of the gas introducing gap, center of an arc drawn by the inner periphery of the top surface of the bank component coincides with the axis of rotation of the susceptor, and so that the center of an arc drawn by
15 the inner periphery of the lower surface of the upper lining component is set on the downstream side, in the direction of flow of the source gas, rather than on the axis of rotation of the susceptor, and

so that the radius of the arc drawn by the inner periphery of
20 the lower surface of the upper lining component is set larger than the radius of arc drawn by the inner periphery of the top surface of the bank component.

5. A vapor phase growth apparatus allowing vapor phase growth of a silicon single crystal film on a main surface of a silicon single crystal substrate to proceed therein,

having a reaction vessel having a gas introducing port
5 formed on a first end side in the horizontal direction, and having a gas discharging port on a second end side in the same direction, configured as allowing a source gas for forming the silicon single crystal film to be introduced through the gas introducing port into the reaction vessel, and to flow along the main surface of the silicon
10 single crystal substrate held in a near-horizontally rotating manner in the inner space of the reaction vessel, and to be discharged through the gas discharging port, the silicon single crystal substrate being disposed on a disc-formed susceptor rotated in the inner space, and having a bank component disposed so as to surround
15 the susceptor, and kept in a positional relation so as to align the top surface thereof at an almost same level with the top surface of the susceptor, and

further configured so that the gas introducing port is opened so as to oppose to the outer peripheral surface of the bank
20 component, so as to allow the source gas supplied through the gas introducing port to collide against the outer peripheral surface of the bank component and to climb up onto the top surface side thereof, and then to flow along the main surface of the silicon single crystal substrate on the susceptor,

further comprising an upper lining component disposed so as to hang over the bank component, while forming a gas introducing gap communicated with the reaction vessel by the bank component and the upper lining component;

5 configured so that the inner periphery of the lower surface of the upper lining component is located on the upstream side, in the direction of flow of the source gas, rather than the inner periphery of the top surface of the bank component,

 so that, on the exit side of the gas introducing gap, the
10 center of an arc drawn by the inner periphery of the top surface of the bank component coincides with the axis of rotation of the susceptor, and so that the center of an arc drawn by the inner periphery of the lower surface of the upper lining component is set on the downstream side, in the direction of flow of the source gas,
15 rather than the axis of rotation of the susceptor, and

 so that the radius of the arc drawn by the inner periphery of the lower surface of the upper lining component is set larger than the radius of the arc drawn by the inner periphery of the top surface of the bank component.

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6. The vapor phase growth apparatus as claimed in any one of Claims 1 to 5, further comprising an evacuation system keeping an inner space of the reaction vessel under a reduced pressure lower than the atmospheric pressure.

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7. A method of fabricating an epitaxial wafer, disposing the silicon single crystal substrate in the reaction vessel of the vapor phase growth apparatus described in any one of Claims 1 to 6, allowing a source gas to flow in the reaction vessel so as to
5 epitaxially grow a silicon single crystal film on the silicon single crystal substrate in a vapor phase, to thereby obtain an epitaxial wafer.

8. The method of fabricating an epitaxial wafer as claimed
10 in Claim 7, wherein the silicon single crystal film is epitaxially grown on the silicon single crystal substrate in vapor phase, by using any one gas selected from the group consisting of monochlorosilane gas, dichlorosilane gas and trichlorosilane gas as the source gas, while keeping the inner space of the reaction vessel under a
15 reduced pressure lower than the atmospheric pressure.

9. The method of fabricating an epitaxial wafer as claimed in Claim 7 or 8, setting the degree of opening of an inner valve regulating flow rate of the source gas flowing closer to the
20 horizontal standard line, and an outer valve regulating flow rate of the source gas flowing more distant from the horizontal standard line, corresponding to the length-to-be-formed of the gas introducing gap in the parallel direction with the horizontal standard line.